the comments which follow.

Discussion of Kondo

Claims 1-12, 27 and 43 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Kondo. This is respectfully traversed. An anticipation rejection requires that each and every element of the claimed invention as set forth in the claim be provided in the cited reference. See *Akamai Technologies Inc. v. Cable & Wireless Internet Services Inc.*, 68 USPQ2d 1186 (CA FC 2003), and cases cited therein. As discussed in detail below, Kondo does not meet the requirements for an anticipation rejection.

Kondo discloses an encoding method whereby continuous frames in a code sequence can be divided into a plurality of regions, such that the regions can be encoded in parallel and the encoded regions can be recombined such that the code sequence of the regions is maintained as if the frame was not divided. The Examiner references the Figure 7 embodiment of Kondo described at Columns 16-17. In the Figure 7 embodiment, an input picture 197 is divided into divided picture signals 198, 199, and 200 by picture divider 182. The divided picture signals 198, 199, and 200 each include divided frames 122 and 135, 123, and 136, and 124 and 137, respectively (from frames 121 and 134 of Figure 5). The divided picture signals are input into encoders 183, 184, and 185 respectively. The encoders encode the picture signals in accordance with an encoding control signal 206 from division controller 196. The encoding control signal indicates the encoding condition of each frame, such as the information in the header of a hierarchical level of frame or higher levels, the maximum range of motion compensation, a quantization matrix, and the like. The encoders 183, 184 and 185 encode the regions under the same conditions based on the encoding signal 206. Code

sequences 201, 202, and 203 are generated for the divided picture signals (see Figure 5B). Output selectors 186, 187, and 188 direct these code sequences to the appropriate memory, such that they can be input into code sequence synthesizer 195 and then output as a single code sequence 204. The code sequence synthesizer 195 combines the code sequences together based on the code sequence synthesis control signal 209, in order to combine the code sequences in the memory in an order as if the frames were not originally divided (Col. 16, line 18 - Col.. 19, line 40).

Accordingly, Kondo is directed at providing parallel encoding of regions of frames using multiple encoders, while still maintaining an output code sequence having the same sequence and syntax as if the frames were not divided to begin with (Col. 17, lines 41-46).

The Examiner indicates that Kondo discloses "means (196 of fig. 7) for determining a target quantization level for a video frame (the maximum range of quantization matrix or level, col. 16, lines 40-50)" (Office Action, page 3). Applicant's respectfully submit that Kondo does not specify a "maximum range of quantization matrix or level" as indicated by the Examiner. The cited portion of Kondo indicates the division controller 196 sends an encoding control signal 206 to the encoders. This encoding control signal 206 may include "the maximum range of motion compensation, a quantization matrix, and the like." (Col. 16, lines 44-49). The Examiner incorrectly assumes that the term "maximum range" modifies the term "quantization matrix". Applicant's respectfully submit that the phrases "maximum range of motion compensation" and "a quantization matrix" are <u>discrete and unrelated phrases</u>. Accordingly, Kondo does not disclose a "maximum range of quantization matrix or level" as indicated by the Examiner. Kondo discloses only an encoding control signal which contains: (1) a maximum range of motion compensation; and

(2) a quantization matrix.

Further, Applicant respectfully submits that a maximum quantization level, assuming *arguendo* that one is disclosed in Kondo, is not equivalent to a "target" quantization level as claimed by Applicant. There is no disclosure in Kondo of determining a target quantization level for a video frame.

In addition, each of the divided picture signals 198, 199, and 200 of Kondo contain divided frames from more than one frame. For example, picture signal 198 of Kondo contains divided frame 122 from frame 121 and divided frame 135 from frame 134 (Col. 16, lines 37-39; Figure 5A). Accordingly, Kondo processes in parallel signals containing divided regions (panels) from two different frames, rather than processing in parallel panels from the same frame as claimed by Applicant.

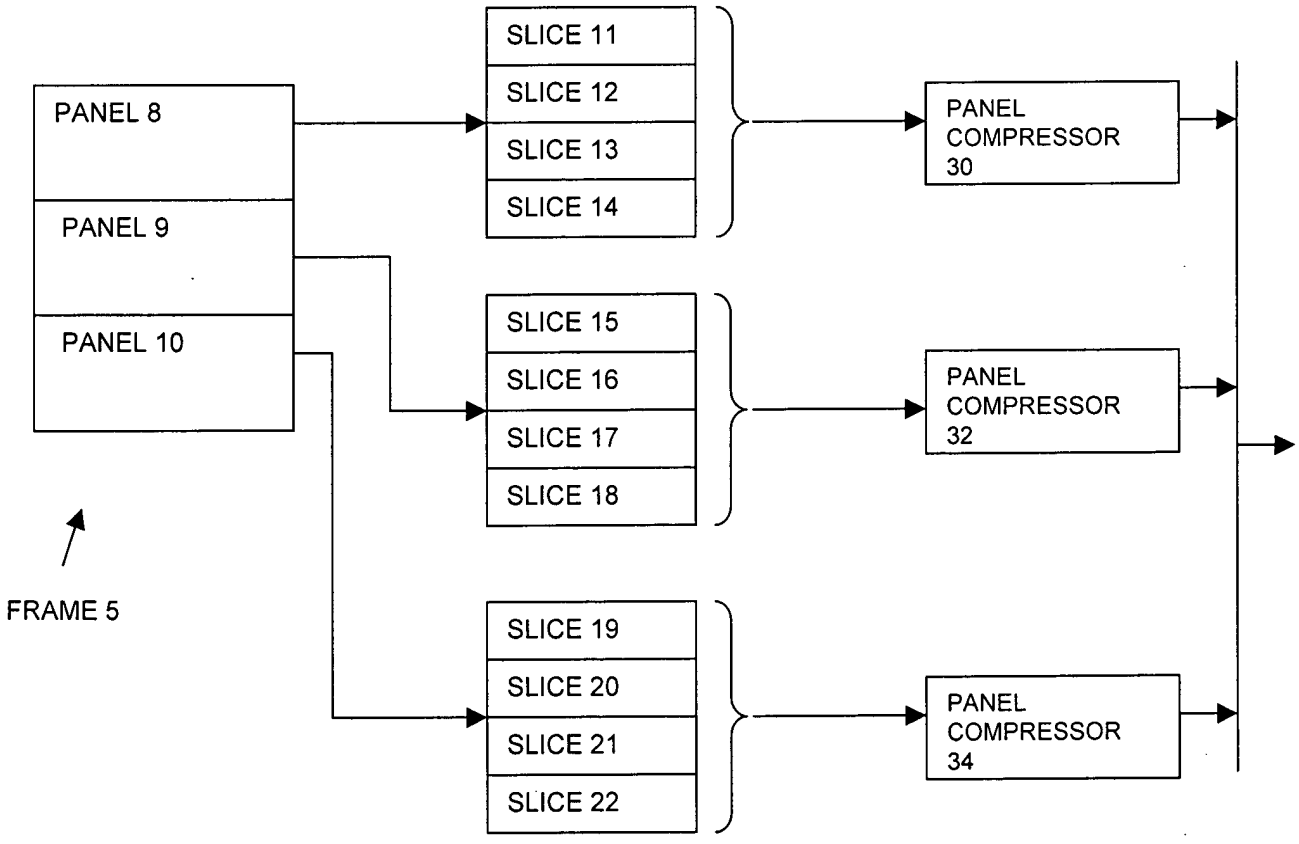
Also, in Kondo it is disclosed that each of the divided picture signals 198, 199, 200 are encoded all under the same conditions based on encoding control signal 206 (Col. 16, lines 49-51). In other words, the same encoding control signal 206 is sent to each encoder 183, 184, and 185 for encoding each of the signals 198, 199, 200. Therefore, there is no variation of the encoding parameters within each encoder or even between the encoders of Kondo. In contrast, with Applicant's claimed invention, each panel that is processed in parallel by the parallel encoders is divided into slices. The first slice is encoded at an encoder in accordance with the target quantization level, and the subsequent slices in that panel encoded by that encoder are encoded at a quantization level that is allowed to vary from the target quantization level until a last slice to be encoded is reached. The quantization level of the last slice is driven towards the target quantization level used to encode the first slice in that panel at that encoder. Accordingly, with Applicant's claimed invention, the quantization level used to encode the panels is allowed to vary, not only between the

individual slices of each panel at each encoder, but between the different panels encoded at each encoder. In Kondo, all panels and slices at each encoder are apparently encoded using the same quantization matrix provided by the encoding control signal 206, which is the same for each encoder.

Contrary to the Examiner's assertions, there is simply no disclosure in Kondo that the quantization level used for encoding the last slice of each panel is driven toward the target quantization level. Kondo discloses only that a quantization matrix is provided to the encoders by the encoding control signal 206. No further details are provided in Kondo regarding this quantization matrix.

The Figure below shows an example of one processing cycle which occurs with Applicant's claimed invention.

APPLICANT'S INVENTION - ILLUSTRATION OF ONE PROCESSING CYCLE



With Applicant's invention, the frame 5 is divided into a plurality of panels 8, 9, and 10. Each panel contains a plurality of slices. For example, panel 8 contains slices 11, 12, 13 and 14; panel 9 contains slices 15, 16, 17, and 18; and panel 10 contains slices 19, 20, 21, and 22. Each panel 8, 9, and 10 is then processed in parallel by panel compressors 30, 32, and 34 respectively. In other words, panel 8 (with slices 11, 12, 13, and 14) is processed by panel compressor 30; panel 9 (with slices 15, 16, 17, and 18) is processed by panel compressor 32; and panel 10 (with slices 19, 20, 21, and 22) is processed by panel processor 34, all at the same time in a single processing cycle. Accordingly, with Applicant's claimed invention, the entire frame 5 is processed in a single processing cycle.

During processing at each panel compressor, the first slice is encoded at a target quantization level, the remaining slices in the panel are encoded at a quantization level that is allowed to vary from the target level. However, the quantization level used to encode the last slice in each panel is driven towards the target level used to encode the first slice of each panel. For example, referring to the above figure, slice 11 of panel 8 will be encoded by panel compressor 30 at the target quantization level. Slices 12 and 13 of panel 8 will be encoded with a quantization level that may vary from the target level used to encode slice 11. When the last slice of panel 8, slice 14, is reached, the quantization level will be driven back towards the target level used for encoding of the first slice 11. The same procedure takes place with the slices of panels 9 and 10, with the first slices of these panels (slices 15 and 19) being encoded at the target level, and the last slices of these panels (slices 18 and 22) being encoded at a quantization level that is driven back towards the target level used for encoding first slices 11,

15, and 19. Accordingly, as the slices at the panel boundaries (e.g., slices 14 and 15, and slices 18 and 19) will be encoded with similar or identical quantization levels, visible artifacts caused by abrupt changes in the quantization levels at the panel boundaries will be reduced if not eliminated. In other words, if slices 14 and 15, which are the last and first slices of panels 8 and 9 respectively, are encoded with very different quantization levels, a visible artifact will be present in the picture. However, with Applicant's invention, slice 15 is encoded using the target quantization level. Slice 14 is encoded using a quantization level that is driven towards the target level used to encode the first slice 15 of panel 9. As the quantization scale value used to encode the last slice 14 panel 8 is driven closer to the target quantization level used to encode the first slice 15 of panel 9, the panel boundary becomes less and less visible.

Kondo does not disclose or suggest that the quantization level used for encoding the last slice of each panel is driven toward the target quantization level, as claimed by Applicant.

Further, Kondo does not solve the problem addressed by the Applicant's claimed invention, which is to avoid visible artifacts at panel boundaries when panels of a video frame are processed in parallel. Kondo is directed only at maintaining the sequencing and video syntax of video frames when they are divided into panels and processed in parallel with other panels from other video frames.

In sum, Kondo does not disclose the subject matter of Applicant's independent claims. For example, Kondo does not disclose or suggest determining a target quantization level for a video frame. Kondo also does not disclose or remotely suggest encoding the first slice of each panel in accordance with the target quantization level, and driving the quantization level used to encode the last slice of each of the image panels toward

the target quantization level used to encode the first slice of each panel, while allowing the quantization level used to encode slices of each panel between the first and last slice to vary from said target quantization level, as set forth in Applicant's claims 1 and 27.

Kondo does also does not disclose the features of Applicant's dependent claims. For example, the Examiner has also rejected claim 2 based on Kondo, indicating that Kondo "discloses wherein the driving step uses piecewise linear feedback (206 of fig. 7) to drive the quantization level . . ." (Office Action, page 4). As discussed above, the signal 206 of Kondo is the encoding control signal from the division controller to the encoders. This signal 206 is not a "feedback" signal as claimed by Applicant. Further, as discussed above, there is no disclosure in Kondo of driving a quantization level of a last slice in a panel toward the target level. Accordingly, Kondo does not disclose or remotely suggest the features of Applicant's claim 2.

Regarding the Examiner's rejection of claim 3 in view of Kondo, since Kondo does not disclose that the quantization level used to encode a last slice in each panel is driven back towards the target level used to encode the first slice in each panel as discussed above, Kondo cannot disclose how to avoid abrupt variations in the quantization levels between the first and last slice of each panel, as claimed by Applicant and discussed above.

With regard to the rejections of claims 4 and 5, the Examiner apparently equates intra- and inter-frame coding with Applicant's adjustment of a GOP target bit rate based on a number of film or non-film pictures. There is no mention in Kondo of how to handle film verses non-film pictures or how to adjust a GOP target rate to account for film or non-film pictures. The difference between film and non-film pictures is the frame rate of the pictures. It is well known in the art that non-film pictures are normal video frames with a frame rate of 30 frames

per second. Film pictures are video frames shot at 24 frames per second (i.e., movie films). To convert film pictures to normal (i.e., non-film) video, the 24 frames per second of movie film is converted to 30 frames per second by scanning every other frame with three fields instead of two. In contrast, an intra-coded picture or frame is one that can be decoded without reference to any other frame, while an inter-coded frame can only be decoded by reference to a prior or subsequent frame.

In summary, there is simply no disclosure or suggestion in Kondo to:

(1) encode the first slice of each panel in accordance with the target quantization level,

(2) drive the quantization level used to encode the last slice of each of the image panels toward the target quantization level used to encode the first slice of each panel,

(3) while allowing the quantization level used to encode slices of each panel between the first and last slice to vary from said target quantization level,

as set forth in Applicant's independent claims.

As Kondo does not disclose each and every element of the invention as claimed in claims 1-12, 27 and 43, the rejections under 35 U.S.C. § 102(e) are believed to be improper, and withdrawal of the rejections is respectfully requested. See, *Akamai Technologies Inc., supra*.

Applicant respectfully submits that the present invention is not anticipated by and would not have been obvious to one skilled in the art in view of Kondo, taken alone or in combination with Katta or any of the other prior art of record.

Withdrawal of the rejections under 35 U.S.C. § 102(e) and 35 U.S.C. § 103(a) is therefore respectfully requested.

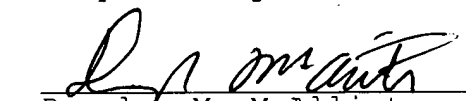
Further remarks regarding the asserted relationship between Applicant's claims and the prior art are not deemed necessary, in view of the amended claims and the above discussion. Applicant's

silence as to any of the Examiner's comments is not indicative of an acquiescence to the stated grounds of rejection.

Conclusion

In view of the above, the Examiner is respectfully requested to reconsider this application, allow each of the presently pending claims, and to pass this application on to an early issue. If there are any remaining issues that need to be addressed in order to place this application into condition for allowance, the Examiner is requested to telephone Applicant's undersigned attorney.

Respectfully submitted,



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Date: January 28, 2005